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मानक

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IS 11842 (1986): PVC/plastic Hygienic Belting [PGD 31:
Bolts, Nuts and Fasteners Accessories]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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Indian Standard

SPECIFICATION FOR
PVC/PLASTIC HYGIENIC BELTING

1. Scope — Covers the requirements for PVC/plastic hygienic conveyor/elevator belting intended for handling foodstuffs and other products which require hygienic handling.

2. Terminology — For the purpose of this standard the definitions given in IS : 4240-1967 'Glossary of conveyor terms and definitions' and IS : 2828-1964 'Glossary of terms used in the plastics industry' along with the following shall apply.

2.1 Full Thickness Breaking Strength — The maximum force which a test piece cut from the full thickness of the belting withstands during test divided by the original minimum width at the centre of the gauge length of the test piece.

3. Dimensions and Tolerances

3.1 Length — The length of the belting shall be specified by the purchaser subject to the following tolerances:

For belts delivered in the endless state and mounted in that way	± 0.5 percent
For open belts, the maximum difference between delivered length and ordered length	$\begin{matrix} + 2.0 \text{ percent} \\ - 0.5 \text{ percent} \end{matrix}$

3.1.1 The length of the endless belt shall be measured in accordance with the method described in Appendix A to IS : 1891 (Part 1)-1978 'Specification for rubber conveyor and elevator belting: Part 1 General purpose belting (second revision)'.

3.2 Width — Unless otherwise agreed to between the purchaser and supplier, the belting shall be in one of the widths specified in Table 1. The tolerance on width shall be as given in Table 1.

TABLE 1 WIDTHS AND TOLERANCES

Width (mm)	Tolerance	Total Variation in Any One Belt
300 400 500 600 650 800 1 000 1 200 1 400 1 600 1 800 2 000	± 5 mm	5 mm
	± 1 percent of belt width	1 percent of belt width

Note — The tolerances for width other than given in Table 1 shall be that applicable to the next higher standard width.

4. Material

4.1 Plastic Cover-Hygienic Requirement — All the compounding ingredients used in the plastic mix from which the plastic covers are made should be free from harmful ingredients liable to extraction by contact with the foodstuffs and other materials being handled or which may cause development of undesirable odour, taste or discolouration. The compounding ingredients used in the plastic cover should be non-toxic which will not taint materials being conveyed. The non-toxic properties shall be as agreed between the supplier and the user.

4.1.1 The surface of the plastic cover on the carrying side of the belt shall be considerably smooth so that particles of the material conveyed will not stick to the belt and cause contamination.

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4.2 Fabric— The fabric or the grey solid woven carcass used shall be evenly and firmly woven and shall be as free from foreign matter and such defects as knots, lumps and irregularities of twist as is normal in the best manufacturing practices. The belting duck or the grey solid woven carcass can be, all cotton or cotton-nylon blend or nylon or any other man-made fibre as agreed to between the purchaser and the supplier.

5. Construction — The belting shall consist of plies of woven fabric or be a solid woven construction suitably impregnated with plastic and having plastic covers, the whole being fused together in a uniform manner. Rectification of surface defects and blemishes which do not interfere with the satisfactory life of the belt under the conditions of service are permissible provided the test requirements are fully complied with.

5.1 The carcass of the belting shall be of full width construction.

5.2 Transverse Joints — Transverse joints in the plies shall be made at an angle of 45° to 70° and the minimum distance between transverse joints in the same ply shall be as follows:

- a) *Outer plies* — The joints shall be not less than 50 m apart.
- b) *Inner plies* — The joints shall be not less than 10 m apart, but there shall not be more than two joints in any one ply in each 100 m of belting.
- c) *Adjacent plies* — The joints shall be not less than 3 m apart for open edge construction. For folded edge, the cutting of the fabric at an angle of 45° to 70° with the longitudinal axis of the belt, as specified above, ensures the joint in one ply does not coincide with the remaining portion of the same joint in the next ply.
- d) *Non-adjacent plies* — The joints shall be separated by a distance not less than the width of the belt.

5.3 Longitudinal Joints

5.3.1 Spacing of joints — Where there is longitudinal joint in a ply, the distance of the joint from either edge shall be not less than one eighth of the width of the belting for belting up to and including 500 mm in width, and not less than 100 mm for belting over 500 mm in width. In the inner plies the joint shall be so arranged that they are evenly balanced on either side of the centre line of the belting and no two joints coincide in adjoining plies.

5.3.2 Number of joints — In the outer plies the number of longitudinal joints shall be limited as follows:

<i>Carrying Side</i>	<i>Number of Joints in Outer Ply, Max</i>
For belting of width up to and including 500 mm	1
For belting of width over 500 mm	2
<i>Pulley Side</i>	
For belting width up to and including 1 200 mm	1
For belting of width over 1 200 mm	2

5.4 Plastic Cover

5.4.1 Thickness — The cover shall be not less than 1.0 mm thick on each side of the belting. The value of the cover thickness shall not fall below the specified thickness by more than 0.1 mm when measured as described in Appendix A.

5.4.2 Unless the design precludes the provision of the edge cover, the edges shall be suitably protected by means of a distinct layer of PVC compound.

6. Test Requirement of Finished Belting

6.1 Full Thickness Breaking Strength and Elongation

6.1.1 The full thickness breaking strength of the finished belting when determined in accordance with the method described in Appendix C to IS : 1891 (Part 1) -1978 shall be not less than the values given in Table 2 for its type.

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TO
IS : 11842 - 1986 SPECIFICATION FOR PVC/PLASTIC
HYGIENIC BELTING

(Page 1, Table 1) — Substitute the following for the existing table:

Table 1 Widths and Tolerances

(Clause 3.2)

Width (mm)	Tolerance	Total Variation in Any One Belt
50	± 5 mm	5 mm
75		
100		
125		
150		
175		
200		
225		
250		
300		
400	± 1 percent of belt width	1 percent of belt width
500		
600		
650		
750		
800		
900		
1 000		
1 200		
1 400		
1 600		
1 800		
2 000		

NOTE — The tolerance for width other than given in this table shall be that applicable to the next higher standard width.

(Page 2, clause 5.4.1) — Substitute the following for the existing clause:

'5.4.1 Thickness — Unless agreed between the purchaser and the supplier, the thickness of the top cover will range from 0.1 to 1.0 mm. The value of the cover thickness shall not fall below the specified thickness by more than 0.1 mm when measured as described in Appendix A. The bottom cover will normally be either bare, frictioned or with a skim cover.'

(Page 2, clause 5.4.2) — Substitute the following for the existing clause:

'5.4.2 Unless the design precludes the provision of the edge, as in cut edge belting, the edges shall be suitably protected by means of a distinct layer of PVC compound.'

(Page 3, Table 2) — Substitute the following for the existing table:

Table 2 Full Thickness Breaking Strength (Clause 6.1.1)		
Type	Full Thickness Breaking Strength in kN/m Width, Min	
	Longitudinal Direction	Transverse Direction
90	90	Not specified
95	95	Not specified
110	110	Not specified
115	115	Not specified
120	120	Not specified
125	125	Not specified
130	130	Not specified
135	135	Not specified
140	140	Not specified
160	160	63
180	180	71
200	200	80
224	224	90
250	250	100
280	280	112
315	315	125
355	355	140
400	400	160
450	450	Not specified
500	500	Not specified
560	560	Not specified

NOTE — The plastic hygienic belting of strength range given in this table can be had normally with 2 ply to 4 ply constructions.

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TABLE 2 FULL THICKNESS BREAKING STRENGTH
(Clause 6.1.1)

Type	Full Thickness Breaking Strength in kN/m Width, Min	
	Longitudinal Direction	Transverse Direction
160	160	63
180	180	71
200	200	80
224	224	90
250	250	100
280	280	112
315	315	125
355	355	140
400	400	160
450	450	Not specified
500	500	Not specified
560	560	Not specified

Note — The plastic hygienic belting of strength range given in Table 2 can be had normally with 2 ply to 4 ply constructions.

6.1.2 The elongation of the full thickness belting when tested in the longitudinal direction shall be not more than 4 percent at the reference load (10 percent of the specified tensile strength of the belt in the longitudinal direction) and not less than 10 percent at break.

Note — The elongation at the reference force is intended as control test only. It includes some permanent and some elastic stretch and therefore cannot be exactly related to stretch characteristics in service.

6.2 Adhesion — The adhesion between the individual plies and between the cover and the plies or the cover and the solid woven carcass shall be as agreed between the supplier and the user.

7. Packing — The belting shall be packed as mutually agreed to between the purchaser and the supplier.

8. Marking — The belting shall be marked as follows, at the intervals of 5 to 10 m on the carrying surface:

- A character NT identifying the non-toxic hygienic quality of the belting with plastic cover,
- The last two digits of the year of manufacture,
- Letters or trade-mark identifying the manufacturer, and
- The number of this standard.

8.1 Certification Marking — Details available with the Bureau of Indian Standards.

9. Sampling — Depending upon the length of the conveyor belt of the same characteristics (type, grade, etc) ordered, the samples shall be drawn in accordance with Table 3.

TABLE 3 SAMPLING PLAN

Length Ordered in m		No. of Samples*
Over	Up to	
	500	1
500	1000	2
1000	2000	3
2000	3500	4
3500	5000	5
5000	7000	6
7000	10000	7

*A sample shall consist of the full width of the finished belting and not less than 600 mm in length.

10. Information to be Supplied by the Purchaser with Enquiry or Order — As specified in Appendix B.

10.1 When placing the order, the purchaser shall state whether tests are required and the additional length required for the sample, if necessary, shall be included in the total length ordered and paid for by the purchaser.

APPENDIX A

(Clause 5.4.1)

METHOD OF MEASURING THE THICKNESS OF COVERS AND BELT

A-1. Micrometer Gauge Method

A-1.1 Preparation of Sample—Take a 50 mm sample section of the belting, cut across the full width of the belting, both edges of the sample being cut and right angles to the surface and edges of the belting.

A-1.2 Procedure

A-1.2.1 Mark, but do not cut, the sample into nine parts by eight lines extending across the cut edges as shown in Fig. 1.

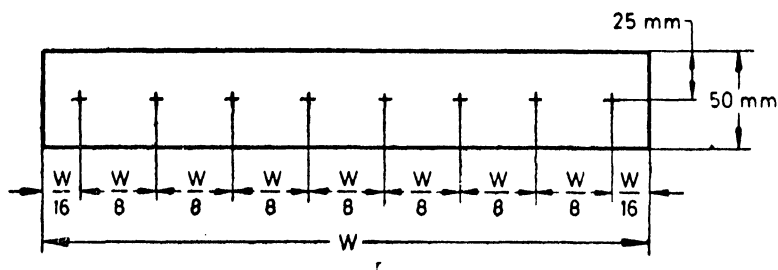


FIG. 1 MEASUREMENT OF THICKNESS

A-1.2.2 Measure the overall thickness of the belt h on each edge at the points marked using a micrometer gauge graduated to 0.01 mm, taking eight measurements in all.

A-1.2.3 Completely remove one cover, including breaker plies if incorporated then measure the thickness h_1 at the same points.

A-1.2.4 Completely remove the other cover, then measure the thickness h_2 at the same points.

A-1.3 Calculation — Take the average values of h , h_1 and h_2 then:

$$\begin{aligned} \text{Thickness of belt} &= h \\ \text{Thickness of one cover} &= h - h_1 \\ \text{Thickness of other cover} &= h_1 - h_2 \end{aligned}$$

A-2. Optical Method (for Thickness of Covers only)

A-2.1 Apparatus — The measuring instrument shall consist of an optical magnifier incorporating a scale graduated in divisions of 0.1 mm.

A-2.2 Procedure — On the surface of a sample of belting, mark a line as shown in Fig. 2A. The line shall not intersect any embossed markings.

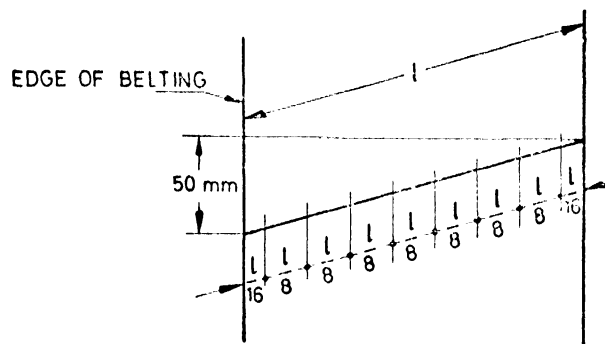


FIG. 2A LINE OF CUTTING BELT TO MEASURE THICKNESS BY OPTICAL METHOD

Cut across this line perpendicularly to the surface. Along the line mark points as shown in Fig. 2B; the distance between marks shall be equal.

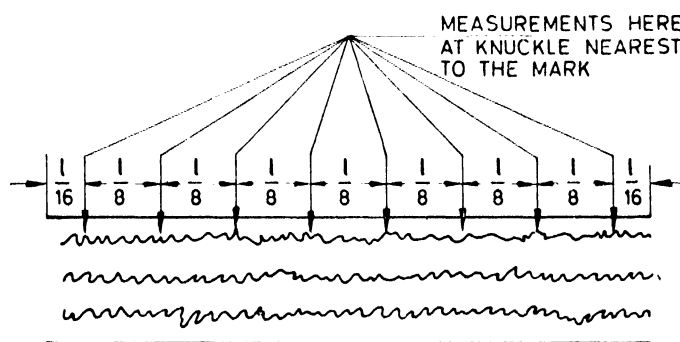


FIG. 2B POSITION OF MEASUREMENT OF COVER THICKNESS AT KNUCKLE NEAREST TO MARK

Measure the thickness of each cover at the fabric knuckles (see Fig. 2B) nearest to each of the eight points. For each cover calculate the mean of the eight results.

APPENDIX B

(Clause 10)

INFORMATION TO BE SUPPLIED BY THE PURCHASER WITH ENQUIRY OR ORDER

B-1. The following information where possible and applicable shall be supplied when the belt is to be used for a new installation or for replacement on an existing conveyor:

- 1) Material to be conveyed and hygienic requirement;
- 2) Conditions; wet, dry, sticky, abrasive, in hot or cold state, temperature if known, or describe conditions, under which to be used, whether cleaners would be required;
- 3) Mass density of material;
- 4) Average size of materials;
- 5) Peak load which will be fed to conveyor... (mass) per minute;
- 6) Conveyor duty..... (mass) per hour per day of.....hours;
- 7) Belt width;
- 8) Belt speed;
- 9) Pulley diameters and drive details;
- 10) Amount of lift (or) (fall);
- 11) Preferred idler arrangement and troughing angle; and
- 12) Any special features or test requirements.

EXPLANATORY NOTE

This standard covers PVC or plastic coated belting for handling foodstuffs and other products where hygienic conditions are of importance.

In the preparation of this standard considerable assistance has been derived from BS 490 (Part 1) : 1985 'Specification for conveyor and elevator belting Part 1: Rubber and plastics conveyor belting of textile construction for general use', issued by British Standards Institution (BSI).

Apart from the above, a general reference to various related national standards has been made in the formulation of this specification.

It has not been found possible to specify limits and tests for detection of toxic materials which are capable of extraction from the plastic cover in significant quantities during use.

While this standard is generally intended for foodstuffs and other products which require hygienic handling, it is however advisable to seek the suppliers' advice with regard to suitability of the material for a particular application, before making a final choice.